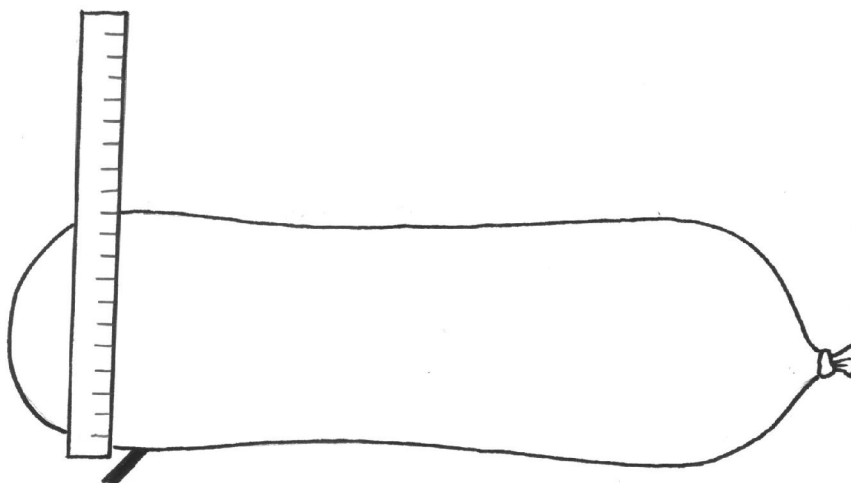


## Student Master

### Finding the Mean

Sea surface height is sometimes reported as the height difference relative to an expected or average height at any given location. In this activity, you will use a balloon as a simple model of the ocean in order to collect some data.



1. Place a sheet of paper across the bottom of a waterproof plastic tub or basin. Lay a balloon filled with water across the paper.
2. Sea surface height data is reported as the height difference relative to an expected or average height at any given location. Choose a location along the length of the balloon. Use a marker to mark that location next to the balloon on the paper at the bottom of the basin.
3. With the balloon sitting undisturbed, stand the ruler at the mark you made on the paper. Measure the height of the balloon at the mark in centimeters and record the height on the data sheet.
4. Now apply pressure somewhere on the balloon so that its shape changes. While pressing on the balloon, measure the height at the mark on the paper and record the height on the data sheet.
5. Repeat step 4 at least three times. Each time, vary the pressure put on the balloon. You can put pressure on a different spot or vary the amount of pressure you apply. Each time, record the height on the data sheet.

6. Next, compute the mean for the data collected.

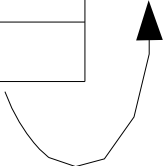
The mean is equal to the sum of all the measurements, divided by the number of measurements recorded.

$$\text{mean height} = \frac{\text{sum of height measurements}}{\text{number of measurements}}$$

7. Once you have the mean, calculate how much each data point deviates from that mean. To do this, subtract the mean from each height measurement recorded. Write the results in the column marked Deviation.

$$\text{deviation} = \text{height measurement} - \text{mean height}$$

Measure- ment	Height	(- Mean)	Deviation
1			
2			
3			
4			
5			
6			
Total			
Mean			

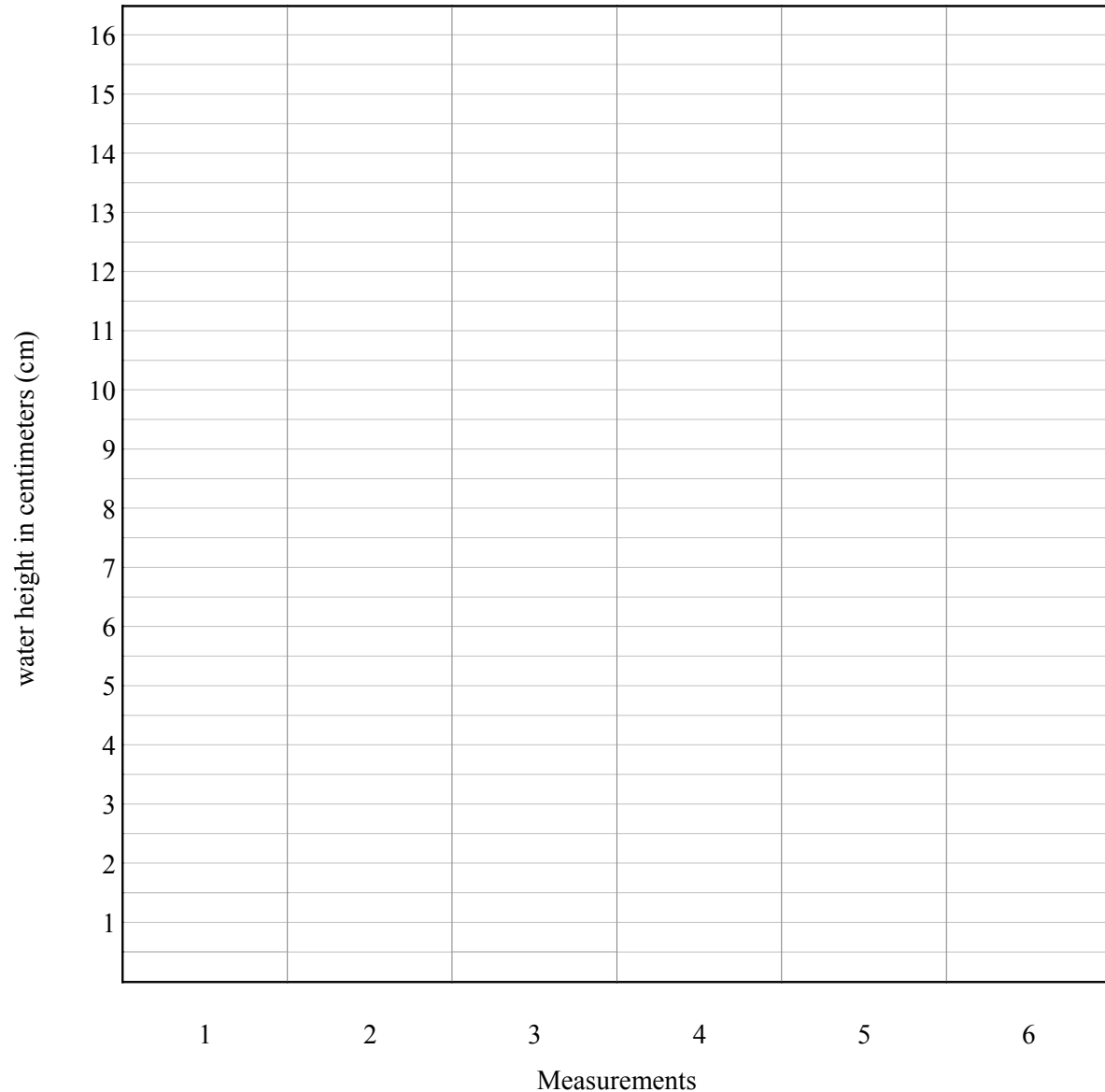


Answer the following questions:

1. Why are some deviation values greater than zero and some less than zero?
2. What does it mean when a deviation value is negative?
3. Relate what you just learned to the color scale on the satellite SSHD map.

## Student Master

### Graph Your Results



Make a bar graph of the height data gathered from the balloon model. Using the grid above, draw a bar to represent each height measurement you recorded.

Next, draw a horizontal line on the grid to represent the mean height you calculated.

How are the height deviations you calculated represented on your bar chart?